

(12) UK Patent Application (19) GB (11) 2 317 484 (13) A

(43) Date of A Publication 25.03.1998

(21) Application No 9624147.6

(22) Date of Filing 20.11.1996

(30) Priority Data

(31) 9619708 (32) 20.09.1996 (33) GB

(71) Applicant(s)

Wave Holdings Limited

(Incorporated in Hong Kong)

5th Floor East Wing, Duke Wellington Hse,
14-24 Wellington Street, Central, Hong Kong,
Hong Kong

(72) Inventor(s)

John Desmond Field

(74) Agent and/or Address for Service

Marks & Clerk

57-60 Lincoln's Inn Fields, LONDON, WC2A 3LS,
United Kingdom

(51) INT CL⁶

G06K 7/00

(52) UK CL (Edition P)

G4M MAA MBF MB3 MB5Y

U1S S1720 S2125 S2127 S2134 S2202 S2215

(56) Documents Cited

GB 2298613 A EP 0670556 A1 WO 93/02430 A2

WO 90/04239 A1 US 5434395 A US 4719338 A

(58) Field of Search

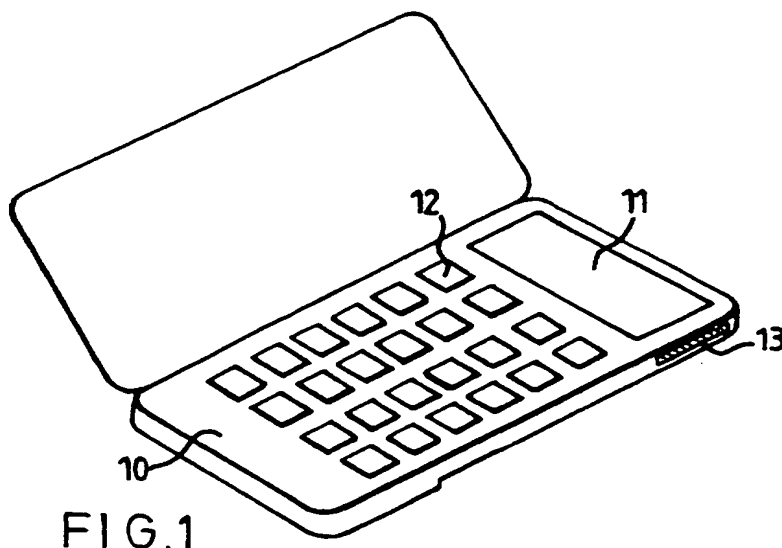
UK CL (Edition O) G4M MAA MBF

INT CL⁶ G06K 7/00 7/01 7/04 7/06 7/08 7/10 17/00

Online:WPI

(54) Pocket value terminal

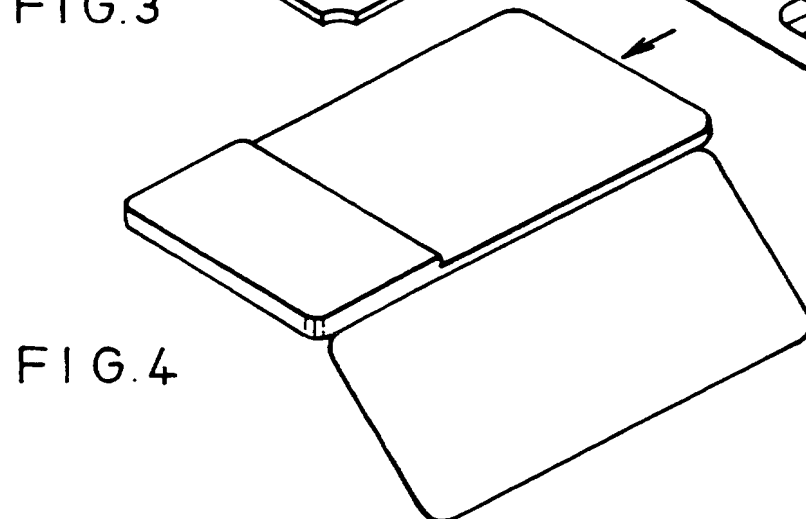
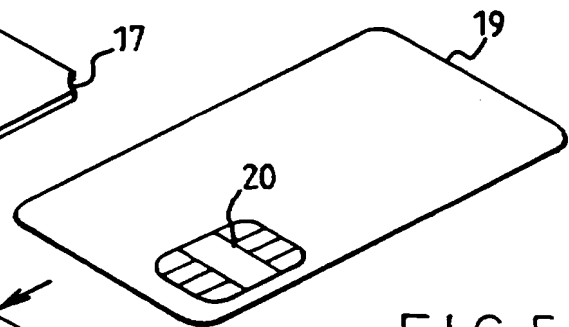
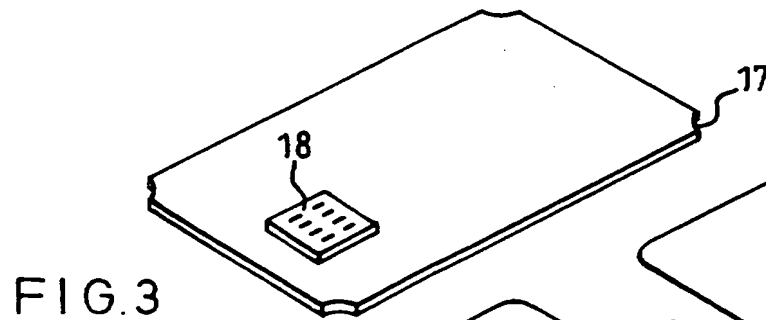
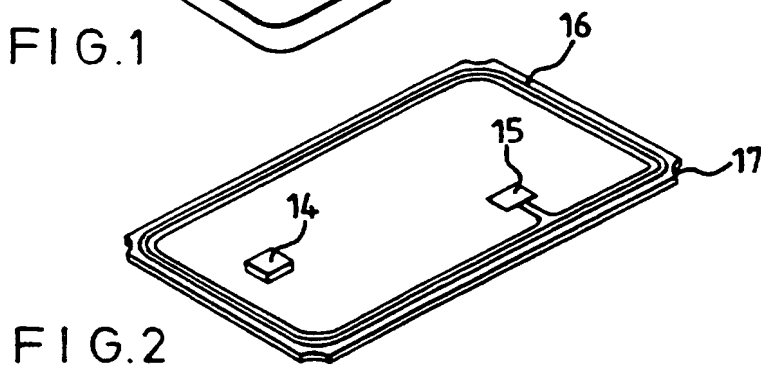
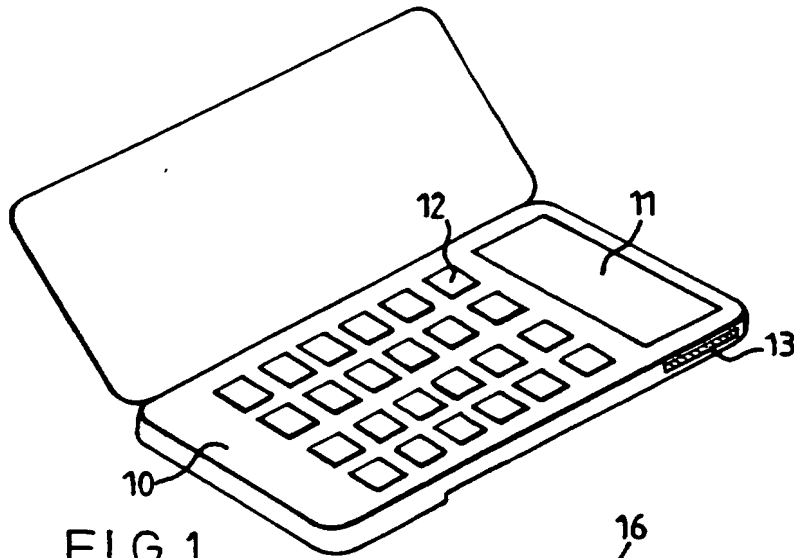
(57) A pocket value terminal comprises a pocketable case 10, a display 11 and a keyboard 12. The case is designed to receive and electrically connect with contact chip cards to carry out various transactions. The case has a multi-pin connector 13 enabling the terminal to be connected to external devices. The central microprocessor may be mounted on a plastic board that also carries a contactless chip. Alternatively, the contactless chip may be mounted on a separate board and held and supported in convenient proximity with the terminal. In this way the terminal acts as a value transfer and communicating device, and can also be used, in contactless mode, to purchase rail journeys and the like.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1995

GB 2 317 484 A



POCKET VALUE TERMINAL

The invention relates to a pocket value terminal that is associated with electronic transaction cards that incorporate a memory, frequently known as smart cards or chip cards, and associated hand-held devices.

The cards consist of a thin rectangular section (typically 85.6 mm x 53.98 mm x 0.76 mm) of plastic material into which is imbedded an integrated circuit which contains complex memory and logic circuits, that operate according to various ISO standards and enable the user to conduct a commercial transaction with a service provider. Such integrated circuits are often referred to as "chips".

Various technologies are used for bi-directional communication with the smart card chips, two of these methods are known as "contact" and "contactless".

Contact chip cards are supplied with contact pads on the surface of the card that are bonded to the chip. It is via a physical electrical connection to these contact pads that communications are accomplished. In contrast, communication to the contactless chip card is via a radio frequency signal transmitted from an external reader. Signals are received via a tuned thin wire aerial in the form of a multi layer loop imbedded in the periphery of the chip card and connected to the chip.

The invention can be applied to any number of chip cards utilising the aforementioned technologies and other associated hand-held devices. Such cards can encompass many applications, typical applications would include, financial transaction cards, stored value cards for transport, telecommunications, car parking meters, identity cards and the like. Such cards are individually prepared and used and, generally stated, comprise a separate card for each function.

A multiple chip card requirement could be achieved by developing a hybrid chip that combines various individual chip function characteristics into a single microprocessor chip. Such a combination leads to extra difficulty with respect to the management protocols of the various functions and in some cases would add greatly to the costs. In terms of mass production or otherwise, it also involves considerable design expense because for each form of combination a specially designed chip is required.

Additionally because of the unproven acceptance level of the individual technologies, many service providers are unwilling to risk the success of their technology by combining with another unproven technology, despite the inherent advantage of combining applications for transport and financial sections, for example.

The change for service providers from using separate chip

cards to the final single hybrid chip card combination solution would require development of several stages. Typically, the stages start by individual cards containing one dedicated chip, then a single card containing two
5 separate chips, and finally a single hybrid chip combining the features of both technologies.

An object of the invention is to provide a mechanism to enable service providers to integrate their technologies during the development phases from independent cards to
10 the hybrid card.

In embodiments of the invention there is provided a common interface that is both independent of the technologies and secure for each of the service providers, the long term financial, legal, operational and technological concerns
15 related to the integration of their services can therefore be addressed safely.

Typical commercial issues with respect to the ownership of the card, what powers does the owner have over the data stored on any single application, and who is responsible
20 for establishing the data structures and security mechanisms need evaluation, and the economic benefits from shared ownership must in any event be carefully considered before committing to combined or hybrid chip architecture.

There exists today various hand-held devices in everyday

use, these may take the form of a pager, mobile telephone, calculator, electronic wallet, organiser, card value reader, or the like. These devices typically incorporate features such as, a display, input interface, printed circuit board and a processor. The cards relating to this invention, and the associated hand-held devices can be regarded as having their respective communication, memory and processing features concentrated in electronic modules mounted on either plastic cards, or printed circuit boards.

In any event and broadly stated, each of the chip cards relating to this invention can be regarded as a simply suitable encapsulation of a chip and other components as applicable. The encapsulation ensures the integrity of the chip, and its components, and allows such chip cards to be manually handled and, where appropriate, electrically "plugged in" to a device or appliance or simply placed in a slot, e.g. for a financial transaction device inserted in a cash dispenser slot.

Some chip cards can be remotely sensed, interrogated and monitored using so-called "contactless technology". Already contactless chip cards are used for railway station entries, road toll collections and electronic driving licenses, for example, where the card is simply "shown" at a distance by a holder or mounted on a vehicle, and automatically communicates with a stationary reader or

monitor.

5 The invention also has application with pagers and mobile phones, calculators, electronic wallets, organisers, card value readers and the like and may be applied to a circuit board that carries one or more chips, and some other electrical components where applicable. For the purposes defining embodiments of the invention, any of the chip cards and associated hand-held devices where applicable, will be referred to as "pocketable communicating devices" 10 to give an indication to their size, format and function.

According to the invention there is provided a combination of two or more different discrete pocketable communicating devices having respective chips for performing their discrete functions, in which the devices are arranged to 15 be physically associated with one another, and one of the devices is a contactless chip card.

Each device may have a separate chip and a single holder or wallet provided to carry the chips physically close to one another in association with one another.

20 Each device may comprise a separate supporting card of plastic material and a housing arranged to receive and carry the two or more cards physically close to one another.

In some of the devices the contactless chip card may be formed or carried on the same plastic card as the other or one of the other devices.

5 An aerial for the contactless chip card may be formed by conductors printed on the or one of the plastic cards of the other devices.

10 One of the devices may comprise a manually operable pocket value terminal incorporating an independent microcomputer. One of the functions of the microcomputer is to communicate directly to one or more pocketable communicating devices, or to enable communications between two or more of these devices, when the devices are physically placed close to the microcomputer during the communicating.

15 The pocket value terminal may be arranged to contain a mechanism for receiving and holding chip cards in position. The pocket value terminal preferably includes a facility to communicate to and/or between at least a chip card and the microcomputer, in which case the contact
20 chip card is electrically connected during the communication process by exposed contacts to the pocket value terminal.

The pocket value terminal preferably also has a multi-pin connection connectable to other appliances.

The housing may comprise a wallet arranged to contain the pocket value terminal.

In the combination, one of the devices preferably comprises a commonly used electrical device that fits into a person's pocket.

One of the devices preferably contains a central processor card. The central processor card may be provided with the means for communicating directly to a chip in another card physically placed adjacent the central microprocessor card during the communicating.

The central processor card may be provided with the means for storing data from any of the service providers in an independent, public partition of its memory, that is securely isolated from the service provider's technology. The content of this memory is accessible via key input and displayed on the device screen.

A device may be arranged to contain the central processor and have a mechanisms for receiving and holding other cards with similar chips in position.

A chip card value reader may be provided and arranged to display the value residing in the memory of a chip card when physically placed within the device.

A holder or a wallet may be arranged to control and transfer value between various other cards physically placed adjacent the central processor.

5 Embodiments of the invention will now be described by way of example with reference to the accompanying schematic drawings in which:-

Figure 1 is an isometric top view of a pocket value terminal;

10 Figure 2 shows an isometric top view of a printed circuit board for the device and forming a combined central processor and contactless chip;

Figure 3 shows an isometric bottom view of the printed circuit board for the device;

15 Figure 4 shows an isometric bottom view of the terminal; and

Figure 5 shows an isometric bottom view of an ISO 7816 type contact chip card.

20 Referring to the drawings, the terminal is provided in a laminar shaped pocketable case 10, having an area approximately equal to a normal credit card, and provided with a liquid crystal display 11 and a keypad 12. A

multiple pin connector 13 mounted at one end of the case 10 enables the terminal to be electrically connected to other devices.

In Figure 3, a printed circuit board 17 is mounted with a type ISO 7816 contact chip connector 18.

A microcomputer 14 of the terminal mounted on the printed circuit board 17 enables direct communication with a contact chip card 19 inserted into the contact chip connector 18. In use the chip 20 on the contact chip card 19 is programmed to communicate in a totally secure manner with the terminal according to a known Mondex (trade mark) system, or other similar contact chip card systems.

In accordance with embodiments of the invention, a contactless chip circuit is provided and comprises a separate contactless chip 15 and an aerial 16 mounted and formed on the printed circuit board 17 respectively. The chip 15 is totally separated from and independent of the microcomputer 14 and the aerial 16 is also electrically isolated from the microcomputer 14. Indeed, as a matter of convenience to maintain overall versatility, the contactless chip card is preferably formed in a separate manufacturing or assembly operation, before the microcomputer 14 and its components have been added to the plastic board. Encapsulation with resin, for example, may however take place after both the microcomputer 14 and the

contactless chip 13 have been mounted to the same printed circuit board.

5 In terms of embodiments of the invention, the described arrangement represents a typical example, where the contactless chip card is used for example for purchasing rail journeys or ticketless flight reservations. The user of the described device can carry out transactions using a contact chip cards, such as obtaining cash at a cash dispenser or transferring money to another like card holder or obtaining information via the terminal's display, relating to the remaining value stored on the contact chip card or the most recent transactional data.

10 Additionally, the user, when conducting transactions with either the contact card or the contactless card features of the terminal, can accumulate loyalty points that have a predetermined relationship to the value of his purchases with either the contact card, or the contactless features of the terminal.

20 These points can be converted by the relevant service provider into a value format that can be stored in a public memory partition of the microprocessor 14, that is accessible by both the contact card service provider and the contactless card service provider, and used jointly or separately by the service providers for distribution between themselves and/or with the users.

25

The contactless device in the described embodiment is formed on the same plastic board that support the terminals' electronic components. In other applications the contactless device may be formed on a same printed circuit board that supports pager, mobile telephone, calculator, card value reader, electronic wallet or, organiser, electronic components. On the other hand, the contactless device may be quite separate, as well as being also discrete in the manner above, and so simply placed or used in proximity with the chip boards of the other "communicating" devices, which devices include the terminal (as described) that communicates with chip cards such as 19.

In any event it will be appreciated that in embodiments of the invention the contactless function is a kind of "add-on" to a communicating device, such as a pocket value terminal, say. There are at least three advantages with providing such an arrangement. Firstly, there is no need to re-design and technically prove the contact chip or the contactless chip as they are known and generally available per se. Secondly, several different kinds of contactless chip cards can be selected and added to one of a variety of contact chip cards. Thirdly, because there are no battery requirements for contactless operation, or generally, the contactless function can be provided next to a standard printed circuit of a pager, a mobile telephone, a calculator, a card value reader, an

1 electronic wallet, an electronic organiser or other
devices. As such, the pager and so forth can be used for
its normal function and also used to obtain entry to a
railway station using the incorporated or added-on
5 contactless chip card feature.

A further advantage of maintaining the chip functions
separate is that it maintains privacy and security between
the respective service providers and/or users.

10 It will be noted that the user or holder of the described
device may be informed, using the microcomputer 14, of the
status of the value remaining on his chip card and has
means of privately obtaining the most recent transactional
data relating to his cards. At present means for
accessing this information are generally located at the
15 service provider, and in many cases such information is
not easily available.

Instructions relating to all the foregoing can be carried
out by the combined use of the display and key input
features of the pocket value terminal.

20 It will be appreciated that whereas a certain contactless
device has been described with a chip mounted on a board
and an aerial formed, by printed circuit or other
technique, on the board, other contactless arrangements
may be used. Such other contactless arrangements include

cards that are read during proximate inductive coupling where the card is normally presented quite closely up to or near a reader. In all cases, the contactless device is any device that does not actually electrically contact the reader directly and is a separate or separately operable device, as explained in the specification.

5

1. A combination of two or more pocketable different discrete communicating devices and respective microprocessor chip for performing a discrete function, in which the devices are arranged to be physically associated with one another, and one of the devices is a contactless device.

2. A combination according to claim 1, in which each of the devices has a separate chip and a single holder or wallet is provided to carry the chips physically close to one another in association with one another.

3. A combination according to claim 1, in which each of the devices is formed on or carried by a respective single printed circuit board.

4. A combination according to any of claims 1 to 3, in which an aerial for the contactless device is formed by conductors printed on the or one of the printed circuit boards.

5. A combination according to any of claims 1 to 4, in which one of the devices comprises a commonly used electrical device that fits into a person's pocket.

6. A combination according to any of claims 1 to 5, in

which one of the devices contains a central microprocessor card.

5 7. A combination according to any of claims 1 to 6, in which the central microprocessor card is provided with the means for communicating directly to a chip in another card physically placed adjacent the central microprocessor card during the communicating.

10 8. A combination according to any of claims 1 to 7, including a device arranged to contain the central processor, the device having a mechanisms for receiving and holding other cards with similar chips in position.

15 9. A combination according to claim 8, including a key fob value reader arranged to display the value residing in the memory of the chip of a card physically placed within the device.

10. A combination according to claim 8, including a wallet arranged to transfer value between various other cards physically placed adjacent the central microprocessor.

20 11. Combined pocketable different discrete communicating devices substantially as herein described with reference to the accompanying drawings.



Application No: GB 9624147.6
Claims searched: 1 to 11

Examiner: John Donaldson
Date of search: 27 May 1997

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.O): G4M(MAA, MBF)

Int CI (Ed.6): G06K 7/00, 7/01, 7/04, 7/06, 7/08, 7/10, 17/00

Other: Online:WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2298613 A (MOTOROLA), see page 4, lines 3 to 35, page 6, line 1 to page 7, line 3	1 to 3, 5 to 10
X	EP 0670556 A1 (GEMPLUS CARD), see column 3, line 14 to column 4, line 26	1 to 3, 5 to 8
X	WO 93/02430 A2 (HALPERN & WARD), see page 15, line 10 to page 16, line 2	1 to 10
X	WO 90/04239 A1 (ELECTRONIQUE SERGE DASSAULT), see abstract, Figures 1, 2	1 to 3, 5 to 8
X	US 5434395 (STORCK), see column 8, line 55 to column 9, line 16, column 11, line 9 to column 12, line 34, column 14, lines 4 to 23	1 to 10
X	US 4719338 (AVERY), see column 3, line 18 to column 4, line 15	1 to 3, 5 to 10

X Document indicating lack of novelty or inventive step
Y Document indicating lack of inventive step if combined with one or more other documents of same category.

& Member of the same patent family

A Document indicating technological background and/or state of the art.
P Document published on or after the declared priority date but before the filing date of this invention.
E Patent document published on or after, but with priority date earlier than, the filing date of this application.